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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,701	01/29/2002	Salman M. Kassir	212/361	8364

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EXAMINER

MACKEY, TERRENCE M

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/19/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/059,701

Applicant(s)

KASSIR, SALMAN M.

Examiner

Terrence Mackey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 - 17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Detailed Action

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 4, and 13 – 15 are rejected under 35 USC 103 (a) as being unpatentable over Humphrey (6,337,027) in view of Grupen-Shemansky (5,268,065).

Applicant claims a method of manufacturing an integrated circuit chip comprising building up a plurality of integrated circuits on the front side of a silicon wafer substrate, grinding the backside of the silicon wafer substrate, and etching the backside of the silicon wafer substrate with an alkali etching solution. Applicant also claims the aforementioned manufacturing process having the additional step of dividing the silicon wafer into a plurality of individual integrated circuit chips. The alkali etching solution may be applied to the silicon wafer substrate by spraying while spinning the wafer followed by rinsing the silicon wafer. Applicant also claims the aforementioned manufacturing process having the additional step of electrically interconnecting and encapsulating following the dividing step.

Humphrey discloses a process for making a microelectromechanical device comprising forming desired structural elements using a glass substrate having a doped epitaxial layer formed thereon, bonding a sacrificial silicon substrate thereto, and thinning the sacrificial substrate. A

combination of both backside grinding and wet etching in KOH may be used to thin the sacrificial substrate (column 6, lines 30-35). Humphrey does not teach the spraying of an aqueous solution of KOH to the substrate while spinning the substrate nor the use of an aqueous solution of 20% KOH.

Gupen-Shemansky teaches a method for thinning a semiconductor wafer including, following mechanically grinding the backside of the wafer, the application of a chemical etchant to the backside of the wafer using a single-side spin etcher (column 5, lines 7-26). The process taught by the reference is beneficial in thinning a semiconductor wafer with increased thermal dissipation and thus reduced internal stress.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the manufacturing process of Humphrey by using the single-side spray etcher as taught by Gupen-Shemansky to provide of the removal of material from the backside of the semiconductor wafer with reduced internal stress.

Claims 5 – 12 and 16 are rejected under 35 USC 103 (a) as being unpatentable over Humphrey (6,337,027) in view of Grupen-Shemansky (5,268,065) and further in view of Frazier et al. (6,136,171).

Claims 5 – 12 and 16 include the above limitations for manufacturing a integrated circuit chip as well as the additional limitation wherein an aqueous solution of potassium hydroxide (KOH) is used as the etchant for removing material from the backside of the silicon wafer substrate. Applicant further claims using an aqueous solution of about 20% KOH.

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Humphrey discloses a process for making a microelectromechanical device comprising forming desired structural elements using a glass substrate having a doped epitaxial layer formed thereon, bonding a sacrificial silicon substrate thereto, and thinning the sacrificial substrate. A combination of both backside grinding and wet etching in KOH may be used to thin the sacrificial substrate (column 6, lines 30-35). Humphrey does not teach the spraying of an aqueous solution of KOH to the substrate while spinning the substrate nor the use of an aqueous solution of 20% KOH.

Gupen-Shemansky teaches a method for thinning a semiconductor wafer including, following mechanically grinding the backside of the wafer, the application of a chemical etchant to the backside of the wafer using a single-side spin etcher (column 5, lines 7-26).

Frazier et al. teach the use of a 20% KOH solution for the bulk etching of a silicon wafer substrate (column 12, lines 58-61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the manufacturing process of Humphrey to use a 20% KOH etchant solution as taught by Frazier et al. applied via a single-side spin etcher as taught by Gupen-Shemansky to provide a desirable etch rate while thinning the semiconductor wafer substrate.

Claim 17 is rejected under 35 USC 103 (a) as being unpatentable over Humphrey (6,337,027) in view of Tamatsuka (6,224,668).

Applicant claims a method for manufacturing an integrated circuit chip comprising building up a plurality of integrated circuits on the front side of a silicon wafer substrate, grinding the backside of the silicon wafer substrate, etching the backside of the silicon wafer

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substrate with an alkali etching solution, the solution being an aqueous solution of sodium hydroxide, and cutting the silicon wafer into a plurality of individual chips.

Humphrey discloses a process for making a microelectromechanical device comprising forming desired structural elements using a glass substrate having a doped epitaxial layer formed thereon, bonding a sacrificial silicon substrate thereto, and thinning the sacrificial substrate. A combination of both backside grinding and wet etching in KOH may be used to thin the sacrificial substrate (column 6, lines 30-35). Subsequent processing included dividing into a plurality of individual die, forming electrical connections, and attachment to a system level substrate such as a circuit board or hybrid substrate or hermetic package (column 6, line 65 through column 7, line 10). The reference does not teach the use of sodium hydroxide (NaOH) as the etching solution.

Tamatsuka teaches on column 8, lines 32-43, the equivalence of etching a bonded silicon substrate using either KOH or NaOH.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the manufacturing process of Humphrey by using NaOH as the wet etchant solution as taught by Tamatsuka since the later reference teaches the equivalence of NaOH to KOH as a silicon wet etchant.

Conclusion

Remaining reference cited to show the state of the prior art.

No claim is allowed.

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Papers relating to this application may be submitted to Technology Sector 1700 by facsimile transmission. Papers should be faxed to Crystal Plaza 3, Art Unit 1765, using fax number (703) 305-6357. All Technology Section 1700 fax machines are available to receive transmissions 24 hrs/day, 7 days/wk. Please note that the faxing of such papers must conform to the Notice published in the Official Gazette, 1096 OG 30, (November 15, 1989).

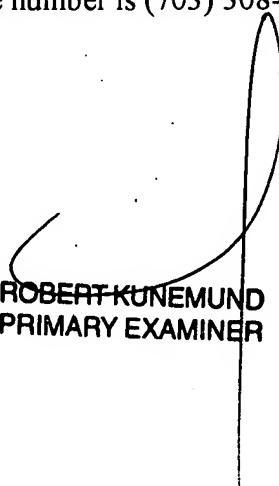
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Terrence Mackey whose telephone number is (703) 305-5504. The Examiner can normally be reached Monday - Friday from 7:00 AM - 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the examiner's supervisor, Ben Uteck, can be reached at (703) 308-3836.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0661.

TMM

June 12, 2003



ROBERT KUNEMUND
PRIMARY EXAMINER